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stars should happen to be thus situated in line with a nebula is manifestly beyond the bounds of probability; there can be no doubt that these novae were actually in the spiral nebulae. The occurrence of these new stars in spirals must be regarded as having a very definite bearing on the "island universe" theory of the constitution of the spiral nebulae.

H. D. CURTIS.

July 28, 1917.

THE SPECTRA OF SOME DOUBLE STARS.

The spectra of the components of the following double stars have been observed at Mount Wilson recently with the Cassegrain spectrograph. The magnitudes and the separations for most of these stars are from a list due to Professor Aitken.

	R. A. 1900	Dec.	Mag.	Dis.	Spectrum
Σ 3062	0 ^h 1 ^m .0	+57° 53'	6.5 - 7.5	1".6	G ₁ - G ₂
η <i>Cassiope</i>	0 43 .0	+57° 17'	3.6 - 7.9	6".5	G ₁ - K ₂
ζ <i>Cancer</i>	8 6 .5	+17° 57'	5.6, 6.3 - 6.0	6"	F ₁ - G ₁
ϵ <i>Hydrae</i>	8 41 .5	+ 6° 47'	3.5 - 7.5	3".2	G ₁ - F ₆
ξ <i>Urs. Maj.</i>	11 12 .9	+32° 6'	4.4 - 4.9	3".0	F ₁ - G ₂
ϵ <i>Boötis</i>	14 40 .6	+27° 30'	2.7 - 5.1	2".8	G ₁ - A ₁
ξ <i>Boötis</i>	14 46 .8	+19° 31'	4.7 - 6.6	2".0	G ₁ - K ₄
μ <i>Herculis</i>	17 42 .5	+27° 47'	3.5 - 10.0, 10.1	32"	G ₁ - M _b
70 <i>Ophiuchi</i>	18 0 .4	+ 2° 31'	4.1 - 6.1	4".5	K ₁ - K ₂

In all cases except those of ϵ *Hydrae* and ϵ *Boötis* the fainter component is of the more advanced type. Perhaps the most interesting star in the list is the faint companion, itself a very close double, of μ *Herculis*. This has the well marked characteristics of the "dwarf" type of M stars.

Under good conditions of definition there seems to be no difficulty in securing the separate spectra of stars of 2" distance even when the difference in magnitude is considerable.

W. S. ADAMS,
A. H. JOY.

PRELIMINARY PARALLAX OF MESSIER 51 (N. G. C. 5194).

Thirty-minute exposures taken at the equivalent 80-foot focus of the 60-inch reflector show the central part of the spiral nebula Messier 51 as a round star-like image, well suited to accurate measurement. Ten plates of good quality, taken in 1916 and 1917, were measured to see whether any sensible parallax could

be discovered, and eight stars of magnitude 11.5 to 13.5 were used for comparison purposes. The result for the relative parallax is

$$\pi_{\text{rel.}} = 0''.000 \pm 0''.010$$

The only other condensation in the nebula which is visible on all the plates is the bright nebulous patch to the north of the center; the images of this point are, however, too asymmetric and too diffuse to afford accurate measurement.

A. VAN MAANEN,

A DISTANT STAR IN HIGH GALACTIC LATITUDE.

The possibility of finding the limit of the galactic system thru the investigation of very faint variable stars was noted some years ago in a paper by Russell and Shapley (*Ap. J.*, 40, 417, 1914). The discussion did not include cluster-type variables, and their distribution in space was not investigated; but the recent work at Mount Wilson on variables in globular clusters shows that these stars have an extremely definite intrinsic brightness, and accordingly they are probably a much better gauge of distance than longer period Cepheids and eclipsing binaries. Furthermore, in clusters the short-period variables appear to be more widely distributed than the other stars of equal or greater luminosity, the apparent area of some systems, when the outlying variables are taken into account, being more than double the area estimated on the basis of the ordinary cluster stars. If the analogy holds in the general galactic system, our faintest cluster-type variables would enclose a volume that contains practically all stars of all absolute magnitudes; and at any rate, their distances give a lower limit to the dimensions of the region that is occupied by isolated members of the galactic system.

The variable RU *Boötis* was discovered at Paris in 1908 by Jules Baillaud on plates made for the Carte du Ciel (*Comptes Rendus*, 147, 230, 1908). His study of the star yielded a period of 11^h 50^m and a light curve typical of the short-period Cepheids (*Bull. Ast.*, 26, 401, 1909). In its faintness the variable is out of the ordinary, and also in its high galactic latitude (+63°), which is exceeded by only one Cepheid variable of known period. These two features indicate a peculiarly great distance from the plane of the Galaxy, if the star's luminosity can be accepted as normal.

Photographs of the variable and its comparison stars have been